Remarks and Arguments

Reconsideration is respectfully requested.

Claims 1-19 and 21-24 are pending in the present application before this amendment. By the present amendment, claims 1, 10, 11, and 15 have been amended. No new matter has been added. Because this amendment should put the application in condition for allowance and should not require any additional searching, the examiner is requested to enter the Amendment.

In the final office action (page 3), claims 1, 10 and 15 stand objected to as containing informalities. Claims 1, 10, and 15 have been amended to address each and every concern as suggested by the examiner. The applicants respectfully submit that claims 1, 10, and 15 are now in compliance. Therefore, withdrawal of the aforementioned objections is respectfully requested.

In the final office action (page 4), claims 15-19 and 21-24 stand rejected under 35 U.S.C. §112, ¶1 as failing to comply with the written description requirement. In response, the applicants have amended claim 15, which recites: --a field emission-suppressing gate portion ~~formed on top of the field emission-suppressing gate portion surrounding the field emitter~~ having an insulator with a gate opening in ~~the~~ a field emission-suppressing gate of the cathode portion formed on a region around the field emitter in the form of surrounding the field emitter that surrounds electrons being emitted from the field emitter-- and ~~--[[a]] --the--~~ a field emission-inducing gate portion having a metal mesh **and formed on top of the field emission-suppressing gate portion** with at least one penetrating hole allowing electrons emitted from the field

emitter to pass therethrough, and a dielectric layer **surrounding the side of the metal mesh in the penetrating hole** ~~formed on at least a part of the metal mesh~~ --. Therefore, the examiner is thanked for performing a diligent review for pointing out the aforementioned rejection and is respectfully requested to withdraw the 35 U.S.C. §112, ¶ 1 rejection.

In the final office action (page 4), claims 15-19 and 21-24 stand rejected under 35 U.S.C. §112, ¶2 as being indefinite. In response, the applicants have amended claim 15, which recites: –a field emission-suppressing gate portion ~~formed on top of the field emission-suppressing gate portion surrounding the field emitter~~ having an insulator with a gate opening in ~~the~~ a field emission-suppressing gate of the cathode portion formed on a region around the field emitter in the form of surrounding the field emitter that surrounds electrons being emitted from the field emitter-- and ~~--[[a]] --the--~~ a field emission-inducing gate portion having a metal mesh **and formed on top of the field emission-suppressing gate portion** with at least one penetrating hole allowing electrons emitted from the field emitter to pass therethrough, and a dielectric layer **surrounding the side of the metal mesh in the penetrating hole** ~~formed on at least a part of the metal mesh~~ --. Therefore, the examiner is thanked for performing a diligent review for pointing out the aforementioned rejection and is respectfully requested to withdraw the 35 U.S.C. §112, ¶ 2 rejection.

In the final office action (page 5), claims 1, 2, 4-6, 8-18, 21, 22 and 24 stand rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,955,833 (Janning).

In the presently claimed invention, the field emission gate portion 200 and the field emission-inducing gate portion 300 are combined together on top of a continuous cathode portion 100 (i.e. no penetrations in the cathode portion 100 that the field emitter is formed **on** top of) to surround the field emitter that forms a cavity with a penetrating hole such that the electrons emitted from the field emitter of a thin or thick film formed of one of diamond, diamond like carbon, carbon nanotube, and carbon nanofiber formed on top of the cathode portion only leave through the **one penetrating hole for each unit pixel**. The field emission-inducing gate 300 also includes a meta mess 320 and a penetrating hole 310 formed within the metal mesh 320, and a dielectric layer 330 **surrounding the side of the metal mesh in the penetrating hole**. Claim 1 has been amended to clarify this aspect of the presently claimed invention. Claim 1 now recites, inter alia:

> --a field emission-inducing gate portion formed on top of the field emission-suppressing gate portion with at least one penetrating hole that surrounds electrons being emitted from the field emitter, and a dielectric layer **surrounding the side of the metal mesh in the penetrating hole** ~~formed on at least a part of the metal mesh~~,
>
> wherein the field emission-suppressing gate portion suppresses electrons from being emitted from the field emitter, and the field emission-inducing gate portion induces electrons to be emitted from the field emitter--.

Nothing in Janning teaches or discloses this element of presently claim 1 of the present invention.

The examiner cites to Janning in FIG. 2a for allegedly disclosing a dielectric layer 40a formed on the mesh 26a, which **completely** surrounds the dielectric layer 26a (OA page 6, #18).

In contradistinction, FIG. 3 of the present invention only discloses a dielectric

layer **surrounding the side of the metal mesh in the penetrating hole**. This amendment for the dielectric layer **surrounding the side of the metal mesh in the penetrating hole** has two effects; one is that the field emission-inducing gate induces the electron emission on the lower voltage than the field emission-inducing gate having no dielectric layer, and the second effect is that the dielectric layer **surrounding the side of the metal mesh in the penetrating hole** prevents leakage current, whereby the emission electrons flow **to** the field emission–inducing gate.

Accordingly, the applicants respectfully submit that Janning does not teach or disclose presently claim 1 of the present invention, that recites inter alia, --a field emission-inducing gate portion formed on top of the field emission-suppressing gate portion with at least one penetrating hole that surrounds electrons being emitted from the field emitter, and a dielectric layer surrounding the side of the metal mesh in the penetrating hole, wherein the field emission-suppressing gate portion suppresses electrons from being emitted from the field emitter, and the field emission-inducing gate portion induces electrons to be emitted from the field emitter–. Thus, the applicants respectfully submit that claim 1 is in condition for allowance over Janning.

As to claims 2, 4-6, 8-9, 11-14, the applicants respectfully submit that these claims are allowable at least because they depend from claim 1, which is now considered to be in condition for allowance for the reasons above.

In regards to presently independent claim 15, claim 15 recites similar features to those found in claim 1. Therefore, for reasons analogous to those argued above with respect to claim 1, claim 15 is in condition for allowance over the cited references.

As to claims 16-18, 21-22, and 24, the applicants respectfully submit that these

claims are allowable at least since they depend from presently claim 15 of the present invention, which is now considered to be in condition for allowance for the reasons mentioned above for presently claim 1 of the present invention.

Further, nowhere in Janning teaches or discloses amended claim 10 of the presently claim invention, which recites inter alia:

> --wherein the ~~**penetration**~~ **penetrating** hole of the field emission-inducing gate portion is one per unit pixel--.

The examiner cites to Janning for allegedly disclosing "the field emission-suppressing gate portion (26') is divided into a plurality of opening (28'), wherein the penetration hole (28a) of the field emission-inducing gate portion (26a) is one per unit pixel (Janning col. 5, lines 56-66) (OA page 7, # 25). Actually, Janning discloses a **plurality of apertures 28a for a single pixel**, where "each pixel can be operated by its own **array** of FED emitters activated in parallel to minimize electronic noise and provide redundancy, so that if one emitter fails the pixel still operates satisfactorily" (Janning col. 4, lines 1-4).

Accordingly, the applicants respectfully submit that Janning does not teach or disclose presently claim 1 of the present invention, which recites inter alia, --wherein the **penetrating** hole of the field emission-inducing gate portion is one per unit pixel--.

Thus, for this additional reason, the applicants respectfully submit that claim 10 is in condition for allowance over Janning. Also, the applicants respectfully submit that claim 10 is allowable at least because it depends from presently claim 1 of the present invention, which is now considered to be in condition for allowance for the reasons mentioned above.

Furthermore, nowhere in Janning teaches or discloses claim 12 of the presently

claim invention, which recites inter alia:

> **--wherein the field emitter is formed of a thin or thick film formed of one of diamond, diamond like carbon, carbon nanotube, and carbon nanofiber--.**

The examiner cites to Janning in FIG. 2a for allegedly disclosing a field emitter 12 being is formed of a thin or thick film formed on one of diamond, diamond like carbon, carbon nanotube, and carbon nonfiber (col. 3, lines 36-40) (OA page 7, #27). However, this disclosure cited by the examiner in Janning **only** states the type of FED designs that are available and not whether Janning uses or is even able to use an thin or thick film FED design, as disclosed by the presently claimed invention. Contrarily, Janning teaches away from this thin or thick film design, because Janning admits that FED has many noted problems the are essentially **unresolved** such as thin or thick film field emitters (Janning, col. 4, lines 10-14) for being able to produce the advantages currently associated with CRT designs (Janning col. 1, lines 23-27). Further, Janning discloses **only** using a type of FED emitter that is typically a "miniature electron gun of micron dimensions", such that when a sufficient voltage is applied between the emitter **tip or edge** and an adjacent extraction gate, "electrons quantum mechanically tunnel out of the emitter" for generating the advantages generally associated with the CRT design. That is, Janning applies an improvement to the above existing "miniature electron gun" from emitted electrons moving upwardly through the **apertures in an arc type path** ("Spindt" tip emitters), over the gate electrodes and then back downwardly to strike the adjacent phosphor areas (Janning col. 3, lines 40-56). Thus, Janning teaches away from having field emitter 12 that is formed of a thin or thick film formed on one of diamond, diamond like carbon, carbon nanotube, and carbon nonfiber, because this thin

or thick film design is **not** capable of forming **apertures in an arc type path from employing Spindt tip emitters**. Hence, Janning only discloses an improvement of an existing Spindt tip emitter for providing an "**enhanced** secondary electron emissions within the FED", [wherein] an amplification enhancement layer is applied over at least selected portions of an outer surface of "an extraction grid of an otherwise conventional FED employing **point-type emitter structures**" (Janning col. 4, lines 32-36, [**emphasis** added]), which has **multiple redundant emitters per each pixel** display.

Further, to emphasis the requirement for **point-type emitter structures** (i.e., spindt tip emitters) in Janning's disclosed invention, Janning discloses that "each emitter 12 has the **shape of a cone**" (Janning col. 5, line 3, [**emphasis** added]), and "has **apertures 28** through which emitted electrons 29 have a path from the emitters 12 to the phosphors 18" (Janning col. 5, lines 12-14, [**emphasis** added]). Furthermore, FIG. 2 of Janning discloses requiring these spindt tip emitters as follows:

> "FED display 10' having similar microtip emitter structures 12', but with one or more dynodes or amplification grids 26a with near monomolecular enhancement layers 40a for staged secondary electron emissions. Layers 40a are particularly effective when placed upon the surfaces of **apertures 28a.** The exposed surfaces of underlying grid structures 26' likewise have enhancement layers 40' deposited thereon, especially on the surface of apertures 28'. The underlying grid structures 26' and 26a are preferably fashioned from the same high amplification factor materials as set forth above with respect to the embodiment of FIG. 1",

(Janning col. 5, lines 56-66 [**emphasis** added]).

As a result, FIGs. 1 and 2 of Janning discloses a Spindt FED that reproduces images using an **array** of nanocone emitters to excite phosphors that would **not** work if Janning uses to the present invention's emitter being of a thin or thick film grown on the cathode or printing a paste already grown on the cathode, which is unable to form

apertures in an arc type path required in Janning.

In contradistinction, FIG. 3 of the present invention discloses having a field emitter 130 as follows:

> "formed of a thick film or a thin film, and may be formed such that any one of diamond, diamond like carbon, carbon nanotube and carbon nanofiber is directly grown on the cathode electrode 120 using a catalytic metal, or may be formed by printing a paste containing any one of powder type diamond, diamond like carbon, carbon nanotube and carbon nanofiber which are already grown".

(specification [0040]).

Accordingly, the applicants respectfully submit that Janning does not teach or disclose claim 12 of the present invention, that recites inter alia, –wherein the field emitter is formed of a thin or thick film formed of one of diamond, diamond like carbon, carbon nanotube, and carbon nanofiber–. Thus, the applicants respectfully submit that claim 12 is in condition for allowance over Janning.

In the final office action (page 11), claims 3, 7, and 23 stand rejected under 35 U.S.C. §103(a) as being obvious over Janning in view of itself.

As to claims 3, 7, and 23, the applicants respectfully submit that these claims are allowable at least because they depend from either claim 1 or claim 15, which are now considered to be in condition for allowance for the reasons above.

In the final office action (page 13), claim 19 stands rejected under 35 U.S.C. §103(a) as being obvious over Janning in view of U.S. Publication No. 2002/0000771

(Ge). The "et al." suffix is omitted in a reference name.

Applicants respectfully traverse this rejection because GE, either alone or in combination with Janning, fails to disclose or suggest all of the claim limitations. Specifically, claim 19 is allowable at least since it depends claim 15, because GE fails to make up for the deficiencies of Janning for claim 15 from analogous reason mentioned above for claim 1.

Therefore, applicants respectfully submit that claim 19 is allowable at least since is depends from claim 15, which is now considered to be in condition for allowance for the reasons mentioned above for claim 1.

For the reasons set forth above, the applicants respectfully submit that claims 1-19 and 21-24, now pending in this application, are in condition for allowance over the cited references. Accordingly, the applicants respectfully request reconsideration and withdrawal of the outstanding rejections and earnestly solicit an indication of allowable subject matter. This amendment is considered to be responsive to all points raised in the office action.

When issuance of a Notice of Allowance is proper in the next action, the examiner is authorized to cancel the withdrawn claims, for which the applicant reserves the right to file a divisional application.

Should the examiner have any remaining questions or concerns, the examiner is encouraged to contact the undersigned attorney by telephone to expeditiously resolve such concerns.

Respectfully submitted,

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